

CLAIMS

It is claimed:

- 5 1. A method of preparing a polysuccinimide polymer, comprising:
- (a) forming a solution of aspartic acid and a water soluble polymerization catalyst in an aqueous medium containing a volatile protic acid selected from the group consisting of hydrochloric acid, hydrobromic acid, and hydroiodic acid;
- (b) drying the solution to give a solid residue; and
- 10 (c) heating the residue at a temperature and for an amount of time sufficient to produce a polysuccinimide polymer.
2. The method of claim 1, wherein the protic acid is hydrochloric acid.
- 15 3. The method of claim 1, wherein the polymerization catalyst is an acidic, hygroscopic compound.
4. The method of claim 3, wherein the catalyst is selected from the group consisting of phosphoric acid (orthophosphoric acid), a polyphosphoric acid, phosphorus pentoxide,
- 20 and combinations thereof.
5. The method of claim 4, wherein the catalyst is present in said solution in an amount between about 5% to 50% by weight of the amount of aspartic acid.
- 25 6. The method of claim 4, wherein the catalyst is present in said solution in an amount between about 20% to 30% by weight of the amount of aspartic acid.
7. The method of claim 1, wherein the molar ratio of protic acid to aspartic acid in said solution is between about 1.0 and about 1.5.
- 30 8. The method of claim 1, wherein said drying is carried out at a temperature between about 60°C and about 160°C.

9. The method of claim 1, wherein said heating is carried out at a temperature between about 150°C and about 350°C.

10. The method of claim 9, wherein said heating is carried out at a temperature between about 180°C and about 240°C.

11. The method of claim 1, wherein said heating is carried out at a temperature and for an amount of time sufficient to produce a polysuccinimide polymer having a weight average molecular weight greater than 30,000.

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12. The method of claim 11, wherein said heating is carried out at a temperature and for an amount of time sufficient to produce a polysuccinimide polymer having a weight average molecular weight greater than 60,000.

13. The method of claim 12, wherein said heating is carried out at a temperature and for an amount of time sufficient to produce a polysuccinimide polymer having a weight average molecular weight greater than 100,000.

14. A polysuccinimide polymer produced by the steps of:

(a) forming a solution of aspartic acid and a water soluble polymerization catalyst in an aqueous medium containing a volatile protic acid selected from the group consisting of hydrochloric acid, hydrobromic acid, and hydroiodic acid;

(b) drying the solution to give a solid residue; and

(c) heating the residue at a temperature and for an amount of time sufficient to produce a polysuccinimide polymer.

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15. The polymer of claim 14, having a weight average molecular weight greater than 100,000.

16. The polymer of claim 15, having a weight average molecular weight greater than 150,000.

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17. The polymer of claim 14, having a substantially linear morphology, such that a branch point occurs fewer than once every 8 residues.
18. The polymer of claim 17, having a weight average molecular weight greater than
5 100,000.
19. The polymer of claim 14, wherein said polymer is off-white to white in color.